Supporting Information

Nitrogen-doped carbon nanotubes synthesized by pyrolysis of nitrogen-rich metal phthalocyanine derivatives for oxygen reduction

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1. The chemical structures of the precursors reported in the literatures

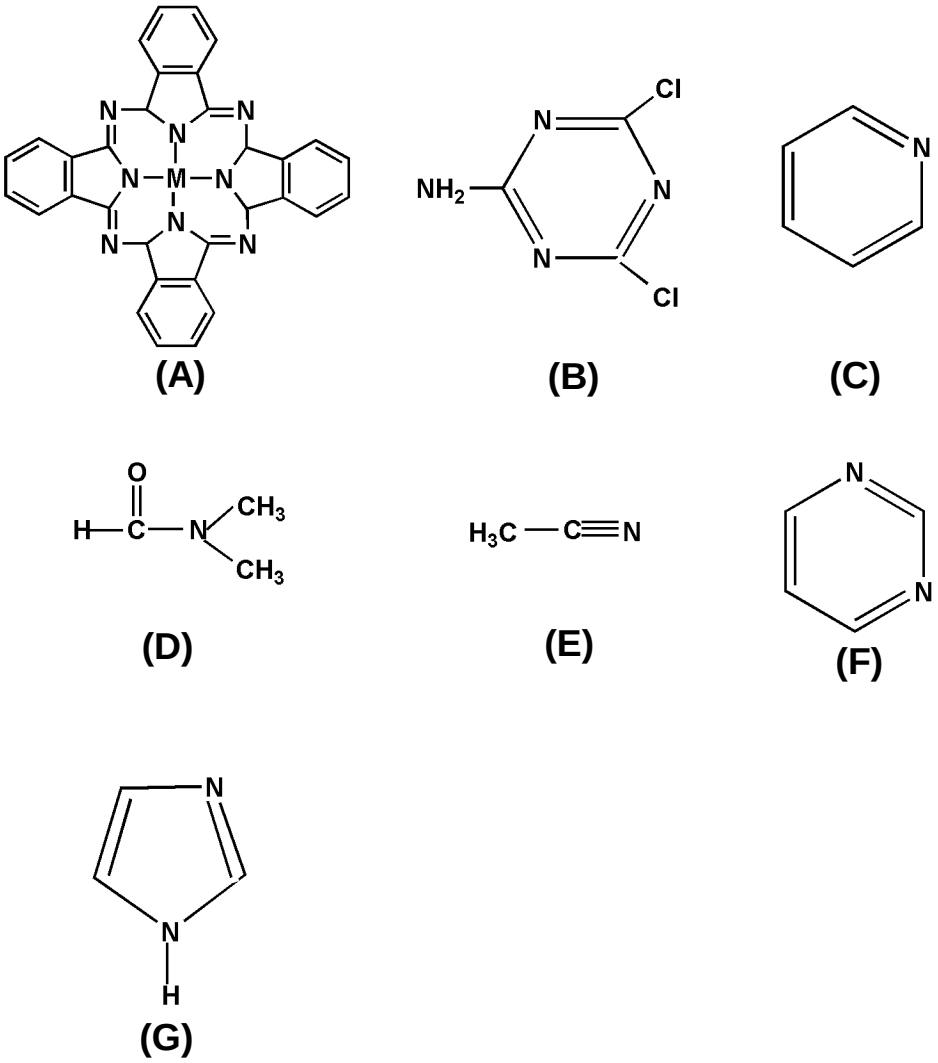

Fig. S1 The chemical structures of the precursors reported in the literatures.

(A) Metal phthalocyanine, (B)2-amino-4,6-dichloro-s-triazine, (C) pyrimidine,

(D) dimethylformamide, (E) acetonitrile, (F) melamine, (G) imidazole.

2. XPS analysis of the obtained N-MWCNTs.

Fig. S2 shows the XPS spectra of the N-MWCNTs obtained. It appears that the surface of the samples consists of C and a small number of heteroatoms N, O, Fe, and Ni. S1 consists of 67.43% C, 13.54% N, 15.70% O, 1.73% Fe, and 1.50% Ni respectively. S2 consists of 68.74% C, 12.72% N, 15.13 % O, 1.19% Fe, and 2.22% Ni, respectively.

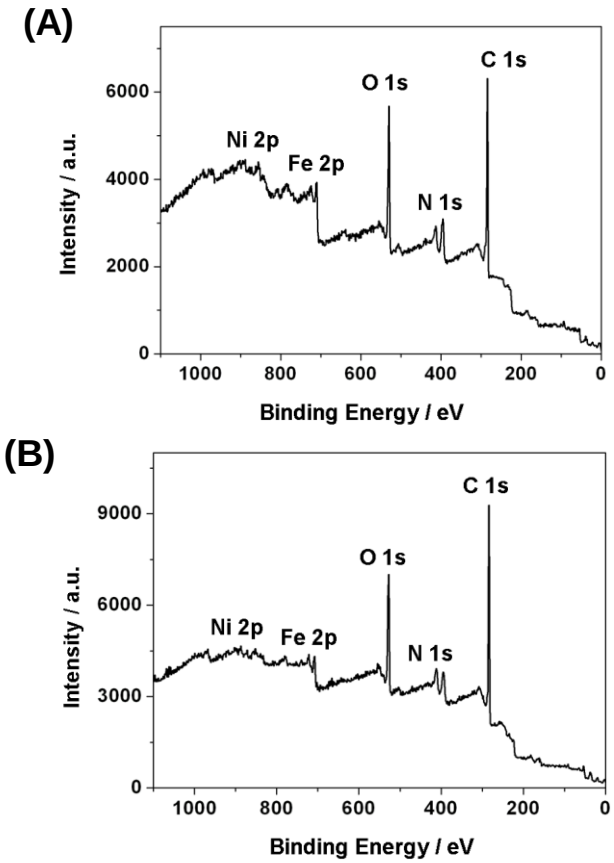

Fig. S2 The overall XPS spectrum of the obtained N-MWCNTs S1(A) and S2 (B).

3. Thermal analysis data

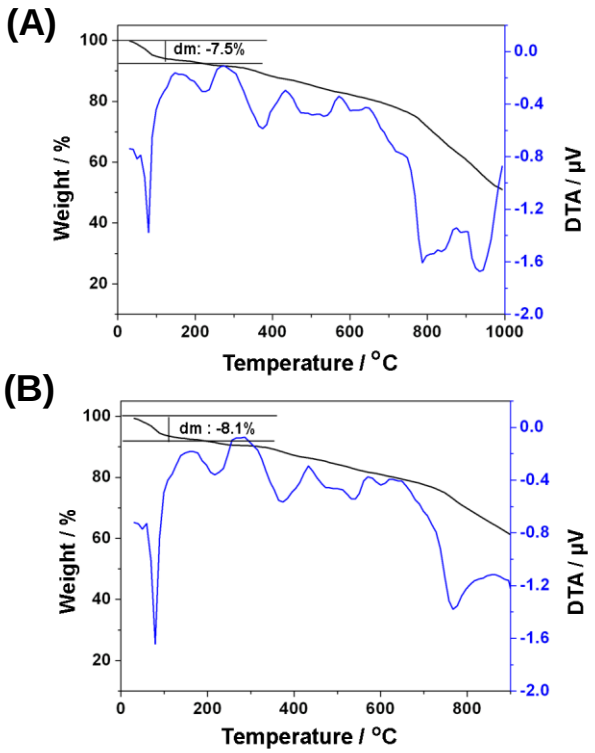

Fig. S3 TG (black) and DTA (blue) data of the obtained N-MWCNTs S1(A) and S2 (B).

TG and DTA data of the N-MWCNTs obtained show that the initial mass loss of the Sample S1 and S2 are ~7.5% and 8.1% at about 100 ^{o}C, indicating the loss of water using as solvent (Fig. S3).